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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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21005	7590	04/07/2006	EXAMINER	
HAMILTON, BROOK, SMITH & REYNOLDS, P.C. 530 VIRGINIA ROAD P.O. BOX 9133 CONCORD, MA 01742-9133			LOVEL, KIMBERLY M	
			ART UNIT	PAPER NUMBER
			2167	

DATE MAILED: 04/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/646,522	<b>Applicant(s)</b> HINSHAW ET AL.	
	<b>Examiner</b> Kimberly Lovel	<b>Art Unit</b> 2167	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 August 2002.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-49 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 January 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>5/03/2004</u> . | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. Claims 1-49 are pending.

#### ***Information Disclosure Statement***

2. The information disclosure statement (IDS) submitted on 5/03/2004 was filed after the mailing date of the application on 8/22/2003. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

#### ***Drawings***

3. The drawings are objected to because Fig. 1 and Fig. 2 are larger than the allotted space and therefore do not fit on the page. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top

margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 101***

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-49 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

**MPEP 2106 IV.B.2.(b)**

A claim that requires one or more acts to be performed defines a process. However, not all processes are statutory under 35 U.S.C. 101. *Schrader*, 22 F.3d at 296, 30 USPQ2d at 1460. To be statutory, a claimed computer-related process must either: (A) result in a physical transformation outside the computer for which a practical application is either disclosed in the specification or would have been known to a skilled artisan, or (B) be limited to a practical application.

Claim 1 recites a method for controlling visibility of data during transaction processing in a multi-version database management system, comprising: receiving a request for a record from a requesting transaction, the requesting transaction having an associated transaction identifier which uniquely identifies the transaction, an invisibility list which identifies other transactions whose effects are to be invisible to the requesting

transaction, and an isolation level which describes whether changes made by other transactions are to be visible to the transaction; and determining whether the record is visible to the requesting transaction based on the isolation level of the requesting transaction, the transaction identifier, the invisibility list of the requesting transaction, and a creator transaction identifier in the requested record which identifies a transaction that created the record.

In the above limitation, there is no physical transformation being claimed, a practical application would be established by a useful, concrete and tangible result.

For it to be a tangible result, it must be more than a thought or a computation and must have a real world value rather than being an abstract idea. The invention as recited in the claim consists of receiving a request for a record and then determining whether the record is visible to the requesting transaction. It is unclear as to what kind of tangible output is obtained by these limitations. Claims 2-24 are dependent on the method of claim 1, and therefore are rejected on the same grounds as claim 1.

Claim 25 recites a multi-version database management system which controls visibility of data during transaction processing comprising: a requesting transaction comprising: an associated transaction identifier which uniquely identifies the requesting transaction; an invisibility list which identifies other transactions whose effects are to be invisible to the requesting transaction; and an isolation level which describes whether changes made by other transactions are to be visible to the requesting transaction; and a transaction manager which receives a request for a record from the requesting transaction and determines whether the record is visible to the requesting transaction

based on the isolation level of the requesting transaction, the transaction identifier, the invisibility list of the requesting transaction, and a creator transaction identifier in the requested record which identifies a transaction that created the record.

Even though claim 25 recites a system, the claim is directed towards software per se. Software per se fails to produce a tangible result. In order for the subject matter to be considered tangible, it must produce a useful, concrete and tangible result. Claims 26-48 are dependent on the system of claim 25, and therefore are rejected on the same grounds as claim 25.

Claim 49 recites a multi-version database management system which controls visibility of data during transaction processing, comprising: means for receiving a request for a record from a requesting transaction, the requesting transaction having an associated transaction identifier which uniquely identifies the transaction, an invisibility list which identifies other transactions whose effects are to be invisible to the requesting transaction, and an isolation level which describes whether changes made by other transactions are to be visible to the transaction; and means for determining whether the record is visible to the requesting transaction based on the isolation level of the requesting transaction, the transaction identifier, the invisibility list of the requesting transaction, and a creator transaction identifier in the requested record which identifies a transaction that created the record.

Even though claim 49 recites a system, the claim is directed towards software per se. Software per se fails to produce a tangible result. In order for the subject matter to be considered tangible, it must produce a useful, concrete and tangible result.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No 6,237,001 to Bamford et al (hereafter Bamford et al) in view of the article, "Efficient and Flexible Methods of Transient Versioning of Records to Avoid Locking by Read-Only Transactions" by Mohan et al (hereafter Mohan et al).

**Referring to claim 1**, Bamford et al disclose a method for managing access to data in a distributed environment. In particular, Bamford et al disclose a method for controlling visibility of data during transaction processing in a multi-version database management system (see abstract), comprising:

receiving a request for a record from a requesting transaction (see column 1, lines 10-14 and column 7, lines 9-12 – transactions D and E are requesting to read record row R), the requesting transaction having an associated transaction identifier which uniquely identifies the transaction (see column 7, lines 9-17 – transaction D would be TXD and transaction E would be TXE), an invisibility list which identifies other transactions whose effects are to be invisible to the requesting transaction (see column 8, line 20 – column 9, line 5 – the CANNOT-SEE set is considered to represent the *invisibility list*; the database system is limited with respect to which versions of data may be supplied to the serializable transaction based on which transactions are located in the CANNOT-SEE set), and an isolation level which describes whether changes made by other transactions are to be visible to the transaction (see column 5, lines 25-41 – the transactions have an isolation level of consistent read mode; the mode isolates transactions that are issuing reads from changes made by excluded transactions that are concurrently issuing writes); and

determining whether the record is visible to the requesting transaction based on the isolation level of the requesting transaction (see column 6, lines 29-45), the transaction identifier (see column 11, lines 30-33), the invisibility list of the requesting transaction (see column 10, lines 11-21 – the CANNOT-SEE set of transaction D includes TXC), and a creator transaction identifier in the requested record which identifies a transaction that created the record (column 7, lines 1-4).

Even though Bamford et al disclose a requesting transaction having an associated transaction identifier, Bamford et al fail to explicitly teach the further

limitation of the identifier uniquely identifying the transaction. Mohan et al also discloses a similar method for controlling visibility of data during transaction processing in a multi-version database management system (see abstract and section 1: Introduction) wherein the requesting transaction has an associated transaction identifier (see section 2: Two Version Algorithm, lines 28-30) including the further limitation of the identifier uniquely identifying the transaction (see section 2: Two Version Algorithm, lines 28-30).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Mohan et al's method of identifying each transaction with an unique identifier as a further limitation to Bamford et al's method for identifying each transaction with an identifier. One would have been motivated to do so in order to accurately keep track of all versions of a particular transaction (Bamford et al: see column 2, lines 1-9).

**Referring to claim 2**, the combination of Bamford et al and Mohan et al (hereafter Bamford/Mohan) discloses the method of claim 1 further comprising: assigning a Record ID value to the record when the record is first created, the Record ID uniquely distinguishing the record from all other records, and the Record ID preserved across modifications of the record (Mohan et al: see section 2: Two Version Algorithm, lines 1-3 and 14-30; and Figure 3 – the Rec ID of record 1234 remains the same even as different transactions access the record altering the current version of record 1234).

**Referring to claim 3**, Bamford/Mohan discloses the method of claim 1 wherein the transaction identifier is a numeric value and transaction identifiers are assigned to

transactions in increasing numerical order based on the start time of the transaction, such that a first transaction can be determined to start before a second transaction if the transaction identifier associated with the first transaction is numerically less than the transaction identifier associated with the second transaction (Mohan et al: see section 2: Two Version Algorithms, lines 28-30; section 2.1: Data Structures and Operations, line 5; Figure 3; and section 3: N Version Algorithm, lines 21-25 – the action of assigning a transaction an unique ID which is greater then the ID assigned to an earlier transaction is considered to satisfy the limitation of determining that a first transaction started before a second transaction since the first transaction ID is numerically less than the second transaction ID).

**Referring to claim 4**, Bamford/Mohan discloses the method of claim 3 wherein transaction identifiers associated with transactions that operate in the present have an even numeric value, and transaction identifiers associated with transactions operating "as-of" a determined time in the past have an odd numeric value (Bamford et al: see column 2, lines 22-30).

**Referring to claim 5**, Bamford/Mohan discloses the method of claim 4 further comprising:

finding a transaction identifier for an earliest transaction that started on or after the specified "as-of" time (Bamford et al: see column 8, line 20 – column 9, line 5);

creating a new transaction, the new transaction having a start-time equal to the specified "as-of" time (Bamford et al: see column 8, line 20 – column 9, line 5);

a transaction identifier equal to the transaction identifier for the earliest transaction, less one; and an isolation level set to Read Committed (Bamford et al: see column 8, line 20 – column 9, line 5); and

initializing the invisibility list of the new transaction to include the transaction identifiers of all transactions having transaction identifiers values less than the transaction identifier for the new transaction and end-times greater than the specified "as-of" time (Bamford et al: see column 8, line 20 – column 9, line 5).

**Referring to claim 6**, Bamford/Mohan discloses the method of claim 5 further comprising:

removing from the invisibility list of the new transaction, any transactions serialized before transactions visible to the new transaction (Bamford et al: see column 8, line 20 – column 9, line 5); and

adding to a visibility list of the new transaction, any transactions with transaction identifiers greater than the transaction identifier of the new transaction, that are serialized before transactions visible to the new transaction (Bamford et al: see column 8, line 20 – column 9, line 5).

**Referring to claim 7**, Bamford/Mohan discloses the method of claim 1 wherein the requesting transaction further comprises an associated visibility list, the visibility list including numeric transaction identifiers which identify other transactions whose effects are to be visible to the requesting transaction (Bamford et al: see column 8, line 20 – column 9, line 5 – the MUST-SEE set is considered to represent the *visibility list* since it includes all of the transactions that made updates that have been seen by the

serializable transaction; Mohan et al: see section 2: Two Version Algorithm, lines 28-30 and Figure 3 – the transaction identifiers are numeric).

**Referring to claim 8**, Bamford/Mohan discloses the method of claim 1 additionally comprising:

initializing an invisibility list of the new transaction (Bamford et al: see column 8, line 20 – column 9, line 5) by:

searching a list of existing transactions to find transactions whose transaction identifier is less than the identifier of the new transaction, and whose state is an active state (Bamford et al: see column 8, line 20 – column 9, line 5; Mohan et al: see section 3: N Version Algorithm, lines 21-37); and

inserting the transaction identifiers of such existing transactions into the invisibility list of the new transaction (Bamford et al: see column 8, line 20 – column 9, line 5 and column 10, lines 11-21).

**Referring to claim 9**, Bamford/Mohan discloses the method of claim 1 further comprising: allowing a transaction to delete a record, by storing the transaction identifier of the transaction in a deleter transaction identifier field of the record (Mohan et al: see section 3: N Version Algorithm, lines 72-174).

**Referring to claim 10**, Bamford/Mohan discloses the method of claim 1 further comprising: allowing a transaction to delete a record, by adding a deletion descriptor to a list of deleted records, the deletion descriptor including the transaction identifier of the transaction performing the deletion and information uniquely identifying the record (Mohan et al: see section 3: N Version Algorithm, lines 72-174).

**Referring to claim 11**, Bamford/Mohan discloses the method of claim 1 further comprising: rolling back changes of a transaction (Mohan et al: see section 2.3: Implementation, lines 33-45), comprising;

examining all records that could have been created, updated or deleted by the transaction (Mohan et al: see section 2.3: Implementation, lines 33-45);

storing an aborted transaction identifier in a deleter transaction identifier field, if present, of records created by the requesting transaction, the aborted transaction identifier is less than a numeric value of any other non-NULL transaction identifier (the examiner concludes that the claim does not require this limitation due to the terminology *if present*);

storing a deletion descriptor in a list of deleted records, if present, the deletion descriptor including the aborted transaction identifier and information uniquely identifying the version of the record (the examiner concludes that the claim does not require this limitation due to the terminology *if present*);

storing a NULL transaction identifier in the deleter transaction identifier field, if present, of records deleted by the requesting transaction (the examiner concludes that the claim does not require this limitation due to the terminology *if present*);

removing the deletion descriptor from a list of deleted records, if present, the deletion descriptor including the identifier of the requesting transaction (the examiner concludes that the claim does not require this limitation due to the terminology *if present*); and

writing records with a modified deleter transaction identifier field to a persistent storage device (Mohan et al: see section 2.3: Implementation, lines 33-45).

**Referring to claim 12**, Bamford/Mohan discloses the method of claim 11 wherein the examining step comprises: starting the examination at a low-water-mark record and ending the examination at a high-water-mark record for a sequential set of records, the low-water-mark identifying a first record in the sequential set of records created, updated or deleted by the requesting transaction (Mohan et al: see Fig 3 – the Action type start is considered to represent the *low-level-mark*), and the high-water-mark identifying a last record in the sequential set of records created, updated or deleted by the requesting transaction (Mohan et al: see Fig 3 – the Action type end is considered to represent the *high-level-mark* since after the transaction ends, no more records for that transaction can be created, updated or deleted).

**Referring to claim 13**, Bamford/Mohan discloses the method of claim 1 further comprising: performing online recovery support for transaction processing, comprising: determining a set of transactions, if any, that had started, but had neither committed nor aborted at the time the database had previously stopped operating; rolling back the changes for each such incomplete transaction (Mohan et al: see section 2.3: Implementation, lines 33-45); and

including the transaction identifiers of each such incomplete transaction on the invisibility lists of all new transactions started before the incomplete transactions have been rolled back (Mohan et al: see section 2.3: Implementation, lines 33-45).

**Referring to claim 14**, Bamford/Mohan discloses the method of claim 2, further comprising:

creating a new record by:

obtaining a unique Record ID for the new record (Mohan et al: see section 2: Two Version Algorithm, lines 14-29);

storing the transaction identifier of the transaction creating the new record and the Record ID in the new record (Mohan et al: see section 2: Two Version Algorithm, lines 14-29; and section 2.1: Data Structures and Operations, line 5); and

storing a NULL transaction identifier value in a deleter transaction identifier field, if present, of the new record (the deleter transaction identifier does not have to exist).

**Referring to claim 15**, Bamford/Mohan discloses the method of claim 1 further providing the ability for a transaction to modify an existing record, comprising:

creating a new record (Mohan et al: see section 3: N Version Algorithm, lines 72-147);

copying fields from the existing record to the new record (Mohan et al: see section 3: N Version Algorithm, lines 72-147);

storing a transaction identifier identifying the transaction in a creator-transaction-identifier field of the new record (Mohan et al: see section 3: N Version Algorithm, lines 72-147);

copying updated data field values in the existing record into corresponding fields in the new record (Mohan et al: see section 3: N Version Algorithm, lines 72-147);

storing the transaction identifier of the transaction in a deleter transaction identifier field of the existing record (Mohan et al: see section 3: N Version Algorithm, lines 72-147), if present;

adding a deletion descriptor to a list of deleted records, if the deleter transaction identifier field is not present, the deletion descriptor identifying the transaction and the existing record (Mohan et al: see section 3: N Version Algorithm, lines 72-147); and

storing a NULL transaction identifier value of the transaction performing the modification in a deleter transaction identifier field, if present, of the new record (the deleter transaction).

**Referring to claim 16**, Bamford/Mohan discloses the method of claim 1 further comprising: retrieving records visible to a transaction operating with Read Uncommitted isolation (Bamford et al: see column 8, line 21 – column 9, line 5) comprising:

reading a record from the database; ensuring that the deleter transaction identifier of the record, if present, is a NULL transaction identifier (Bamford et al: see column 8, line 21 – column 9, line 5); and

ensuring that a list of deleted records, if present, does not include a description of the record (Bamford et al: see column 8, line 21 – column 9, line 5).

**Referring to claim 17**, Bamford/Mohan discloses the method of claim 1 further comprising: retrieving visible records for a requesting transaction operating with

Serializable or Repeatable Read isolation (Bamford et al: see column 8, line 21 – column 9, line 5) comprising:

reading a record from the database (Bamford et al: see column 8, line 21 – column 9, line 5); and

ensuring that the creator transaction identifier of the record is not on the invisibility list of the requesting transaction and has a value less than or equal to the transaction identifier of the requesting transaction (Bamford et al: see column 8, line 21 – column 9, line 5); and

ensuring that the deleter transaction identifier of the record, if present, is a NULL transaction identifier, or is greater than the transaction identifier of the requesting transaction, or is both less than the transaction identifier of the requesting transaction and is stored on the invisibility list of the requesting transaction; and ensuring that a list of deleted records, if present, does not include a description of the record, or that the record was deleted by a transaction whose identifier was greater than the transaction identifier of the requesting transaction, or that the record was deleted by a transaction whose identifier is both less than the transaction identifier of the requesting transaction and is stored on the invisibility list of the requesting transaction (the examiner concludes that the claim does not require this limitation due to the terminology *if present*).

**Referring to claim 18**, Bamford/Mohan discloses the method of claim 17 wherein records that are not visible to the requesting transaction, but that otherwise would meet the restrictions imposed by a database query, are flagged as being invisible

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and temporarily retained in memory (Mohan et al: see section 2.2: Secondary Indexes, lines 1-23).

**Referring to claim 19**, Bamford/Mohan discloses the method of claim 7 further comprising:

removing a transaction identifier of a committing transaction from the invisibility list of a specified transaction operating with Read Committed isolation which may be the requesting transaction or some other transaction, if the transaction identifier of the committing transaction is less than the transaction identifier of the specified transaction (Bamford et al: see column 8, line 20 – column 9, line 5 – the CANNOT-SEE set is considered to represent the *invisibility list*; and

adding the transaction identifier of the committing transaction to the visibility list of the specified transaction, if the transaction identifier of the committing transaction is greater than the transaction identifier of the specified transaction (Bamford et al: see column 8, line 20 – column 9, line 5 – the MUST-SEE set is considered to represent the *visibility list* since it includes all of the transactions that made updates that have been seen by the serializable transaction.

**Referring to claim 20**, Bamford/Mohan discloses the method of claim 19 further comprising: retrieving visible records for the specified transaction operating with Read Committed isolation, comprising:

reading a record from the database (Bamford et al: see column 8, line 20 – column 9, line 5);

ensuring that either (a) the creator transaction identifier of the record is equal to the transaction identifier of the requesting transaction, or (b) the creator transaction identifier of the record is greater than the transaction identifier of the requesting transaction and the creator transaction identifier is on the visibility list of the requesting transaction or (c) the creator transaction identifier of the record is less than the transaction identifier of the requesting transaction and the creator transaction identifier of the record is not on the invisibility list of the requesting transaction (Bamford et al: see column 8, line 20 – column 9, line 5);

ensuring that the deleter transaction identifier of the record, if present, is either (a) a NULL transaction identifier; or (b) less than the transaction identifier of the requesting transaction and on the invisibility list of the requesting transaction or (c) greater than the transaction identifier of the requesting transaction and not on the visibility list of the requesting transaction (Bamford et al: see column 8, line 20 – column 9, line 5); and

ensuring that the list of deleted records, if present, does not include a description of the record, or that record was deleted by a transaction whose identifier was either (a) less than the transaction identifier of the requesting transaction and also on the invisibility list of the requesting transaction or (b) greater than the transaction identifier of the requesting transaction and not on the visibility list of the requesting transaction (the examiner concludes that the claim does not require this limitation due to the terminology *if present*).

**Referring to claim 21**, Bamford/Mohan discloses the method of claim 20 further comprising: avoiding unrepeatable reads comprising:

tracking versions of records retrieved during the course of a transaction;  
checking if a different version of the same record is subsequently retrieved; and  
returning the version of the record originally retrieved or aborting the transaction

(Mohan et al: see Fig 3).

**Referring to claim 22**, Bamford/Mohan discloses the method of claim 1 wherein the step of determining whether the record is visible to the requesting transaction is carried out in a programmable filter (Bamford et al: see column 3, lines 24-41).

**Referring to claim 23**, Bamford/Mohan discloses the method of claim 22 wherein the programmable filter is implemented as a circuit component selected from the group consisting of Field Programmable Gate Array (FPGA), Application Specific Integrated Circuit (ASIC), Application Specific Standard Product (ASSP), discrete logic in a printed circuit board, and an programmable micro-processor (Bamford et al: see column 3, lines 24-41).

**Referring to claim 24**, Bamford/Mohan discloses the method of claim 1 further comprising: retrieving a version of a record visible to a requesting transaction without reference to other versions of the record (Mohan et al: see section 2.1: Data Structures and Operations).

**Referring to claims 25-49**

The system of claims 25-48 are rejected respectively on the same grounds as the method of claims 1-24. The system of claim 49 is rejected on the same grounds as the method of claim 1.

***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- US Patent No 6,957,236 to Ganesh et al titled *Providing a Useable Version of a Data Item*
- US Patent No 6,128,642 to Doraswamy et al titled *Load Balancing Based on Queue Length, in a Network of Processor Stations* which discusses low-level-marks and high-level-marks

**Contact Information**

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kimberly Lovel whose telephone number is (571) 272-2750. The examiner can normally be reached on 8:00 - 4:30.

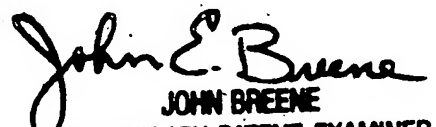
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Breene can be reached on (571) 272-4107. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kimberly Lovel  
Examiner  
Art Unit 2167

kml  
30 March 2006

BC

  
JOHN BREENE  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2100